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ABSTRACT

In 1972, Main Township (Illinois) High School District 207 eliminated its inhouse data processing operation and joined Educational Management Systems (EMS), a regional data processing cooperative. EMS was created by the Institute for Educational Research (IER), which first conducted a thorough study of school district's data processing practices. The IER study indicated that the only feasible way for districts to significantly improve the cost-effectiveness of their data processing operations was to seek the economy of size, the effectiveness of integrated file structures, and the efficiency of cooperative effort. By establishing a regional computer utility, member school districts are able to share the cost required to obtain and maintain the necessary computer staff. Each district can use the computer to satisfy its own requirements independently of other districts using the system. Joining EMS has helped the Maine Township district meet its administrative and instructional data processing needs more completely and economically than before. In fact, most EMS member districts have enjoyed substantial cost savings and a rather dramatic increase in service since joining the cooperative. (Author/JG)

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"HOW COMPUTERS SAVE TIME AND MONEY"
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HOW COMPUTERS SAVE TIME AND MONEY

By way of introduction, Maine Township High School District 207 is located in the northwestern suburban area of Chicago, specifically in the Park Ridge - Des Plaines area. The district is 42 square miles and serves a combined community population of approximately 140,000. We offer a comprehensive course of studies to approximately 12,000 high school age students, 700 special education students, and 20-22,000 adult participants in our adult and continuing education program. Our schools employ a staff of 750 professionals at the secondary level, 75 in special education, 450-500 non-certified personnel, and several hundred adult teachers. Our total budget is approximately $28 million.

For the past thirteen years, Maine Township High School District 207 has used electronic data processing for administrative and instructional purposes. Prior to 1972, District 207 employed a data processing staff to develop and process individual educational applications on an IBM computer. For most of this time we leased an IBM 1401 to perform most of our applications. In 1970 we replaced the 1401 with an IBM 360/25.

During all these years our data processing staff developed a large number of applications. While the two in-house computers assisted staff members in the business, pupil personnel, and administrative offices, each application required a separate program with no integration or correlation between or among them. In addition, thousands of tabulating cards were punched, sorted, collated, and verified before the computer processed them. Although the cards were relatively inexpensive, the personnel and computer hardware were costly.

In 1972, Maine Township High School District 207 eliminated these in-house data processing services in favor of joining a regional cooperative entitled - Educational Management Systems. EMS was created by the Institute for Educational Research, a non-profit educational research organization located in Downers Grove, Illinois, as an outgrowth of a survey requested by its member school districts. Because we were concerned with the high costs of our in-house operation and the stated inefficiencies, IER conducted a thorough study of elementary and secondary school districts' EDP practices, both in the Chicago area and in representative systems across the country. In addition, many service bureaus, time sharing vendors, commercial and college shops, facilities-management specialists, and companies interested in

developing the school EDP market were contacted in the search for viable alternatives. These contacts resulted in a large file of data, pricing structures, and details concerning the state of educational and commercial data processing practices. Although gathered in 1971, much of this information is still current today. I would like to share some of the findings of this study with you this morning:

Elementary Districts

Most elementary districts use EDP, if at all, mainly for business office purposes. Primarily because of prohibitive costs there is no significant on-going instructional use of EDP beyond occasional special or government-funded projects at the elementary school level.

High School Districts

The EDP departments operated by secondary school districts in the Chicago area are, without exception, applications oriented. Thus, the first consideration is given to specific functions of tasks that need to be performed and specific programs are developed accordingly. The result is typically a patchwork of unrelated programs. Data sets are often inaccurate and incomplete and bloated by a combination of inefficient file organization and repetitively stored data elements.

Hardware typically consists of obsolete equipment designed to perform traditional fiscal student accounting tasks. Most high schools have been prevented, in large part by constraints imposed by the hardware configuration, from developing much needed applications in the areas of research, personnel systems, interactive instruction, and information retrieval.

Interactive instruction applications, particularly in Mathematics and Science, are sometimes met by contracting for time-sharing service from a commercial or college vendor or through the purchase of a small time-sharing system. The use of these machines generally represents add-on costs.

Software

Software applications among high school districts are very similar in function. Cost savings could be realized by avoiding duplication of effort. But because each district's software is so specifically written, the sharing of programs is not generally feasible without some willingness to form accommodations of various kinds. The difficulty has been that districts have generally valued the benefits of autonomy more than the prospects of economy that might be gained if a cooperative arrangement could be made to work. However, because of rising EDP costs and tighter budgets there is a greater willingness among many districts to cooperate on EDP operations.

Staffing

Because hardware costs take such a large share of the available EDP budget, insufficient funds are available for adequate staffing. A limited EDP staff leads to many costly inefficiencies, for example, a large amount of crash programming, the division of logically related tasks, and too many small programs and too many undocumented and sometimes not de-bugged programs.

The IER study also examined the costs of independent computer operations. They found that typical per student costs ranged from about $3.00 to nearly $20.00 in IER member districts. The annual budgets for hardware, staff, supplies, and contractual work ranged from $40,000 to nearly $250,000. And expenditures were only projected to spiral.

What then, are the alternatives? Unfortunately, because the elements of systems analysis have all too often been ignored, the feasible alternatives open to an individual district are limited. Generally schools do not begin with the specification of total EDP system objectives. Rather, hardware designed to meet immediate business needs has typically been acquired often on an initial least-cost basis. Fiscal applications are usually the first to be brought up on the system; student accounting, scheduling and grade reporting are the next standard additions. At this point, the direction of system development and utilization priorities are determined. Thus the district's alternatives for improving the cost effectiveness of its independent operation is limited to basically two choices:

1. Costs can be reduced by re-trenching on hardware and doing more by hand, or
2. effectiveness can be increased by adding staff.

Both alternatives are undesirable. In the former case, effectiveness is lost; in the latter case, economy is lost.

The solution, therefore, must lie in a radical reconstruction of school educational data processing practices. Given the existing circumstances, the IER study indicated that the only feasible way was to seek the economy of size, the effectiveness of integrated file structures, and the efficiency of cooperative effort. By adopting a systems approach to the problem, both elementary and secondary districts can meet their total informational and instructional EDP needs in a high, cost-effective manner. What is needed most is not a computer but an information system which ties together all essential data and makes it readily accessible to those who have the need and authorization for specific information.

What is needed is a system designed to meet objectives in three primary areas of interest to elementary and secondary schools. First, the management of educational systems requires the capability to acquire accurate and relevant decision data by administrators. Second, computers can play a significant role in instruction; students should learn about them and how to use them. Teachers can make important uses with EDP tools in both instruction and instructional management. Third, educational research is required in the evaluation of new curriculum, in the development of new educational systems, and in connection with teacher in-service programs. Such research requires economical access to pupil data and capability of performing extensive statistical analysis.

Although a systems approach is the key, the development of software to implement a systems approach takes years to develop and millions of dollars to finance. Therefore, we determined the necessity for purchasing existing software if possible. After a thorough, in-depth examination of several systems, it was determined that the best available system had been recently developed by TIES. Located in Minnesota, TIES had developed for the past several years, at a cost of several million dollars, an operational information system with a uniformly structured, integrated data-base utilizing the most advanced computer concepts and capabilities. Thus, utilizing the purchased computer soft-ware system developed and implemented by the Minnesota TIES project, IER operationalized its Educational Management Systems component in 1972 with six original member school districts being served. Today, membership in EMS has grown to 20 school districts with a total enrollment of approximately 87,000 students. By establishing a regional computer utility to replace individual

district data processing departments, school districts share the cost required to obtain and maintain the necessary computer staff. Each district is able to use the computer to satisfy its own requirements and its own priorities independently of other districts also using the system.

Efficiency is gained by utilizing a single set of programs to meet the common needs of school districts. For example, most accounting, payroll, class scheduling, grade reporting, and many other day-to-day operations of school districts are sufficiently similar that a unified approach can succeed in supplying these services. At the same time, provision has been made to meet the unique needs of districts.

The EMS data processing component operates on a Burroughs 3500 and Hewlett-Packard 2000F; the EMS machinery are multi-processing, carrying out as many as 10 functions at the same time. Using telephone lines, school personnel have direct access to the computer by using a CRT - Cathode ray tube terminal. The EMS system stores data once in an integrated set of files, making data randomly accessible, and includes rapid, accurate inquiry and update capabilities. This integrated feature of the EMS programs facilitates total system update with a single entry of data changes rather than requiring multiple entry of such changes. Basic systems in which EMS provides data processing services are finance budget accounting, payroll-personnel, student information, instruction, and attendance. In addition to the general "housekeeping" applications - payroll, accounting procedures, report cards, mailing labels, student scheduling - these basic systems provide access to reporting from 515

programs, sorts, and simulations. The pass-out provides a brief overview of the basic systems and their reporting capacities.

The original and current focus of EMS is to provide timely, computer generated administrative and educational documents, reports, and support information to member school districts. These aid in making determinations about the operation and maintenance of administrative, support, and instructional programs, procedures and designs. EMS also offers assistance on a broad range of administrative and instructional decision-making applications including fiscal management, student monitoring systems, pupil screening, scoring, and reporting, management by objectives, cost/effectiveness analysis, long range planning, and other approaches.

We joined EMS to help us more economically and more completely meet our administrative and instructional data processing requirements. Specifically, we had five objectives in mind:

1. Increased information for district decision making
2. Increased instructional capabilities of educational data processing
3. An integrated information system for developing PPBES
4. An economical data base for research and information
5. Lower cost

After nearly four years of involvement, I am pleased to report we are meeting all of these objectives.

EMS provides data to aid our district administrators in making decisions in such areas as: The planning and review of the allocation of resources and in cost-effectiveness analysis; in determining staff needs, staff analysis, and other personnel management areas.

Prior to joining EMS, District 207's computer instructional program was limited to hook-ups with nearby universities and cumbersome 24 hour turn-around time with the district computer center. Students' programs on keypunched cards were physically delivered to the center. And computer applications were centered mainly in the Business Education Department.

The EMS instructional program provides on-line capabilities from teletype terminals and card readers located in classrooms. Students are now able to program in three different computer languages with immediate turn-around. Curriculum offerings have increased; more students and teachers are using the computer. The multitude of programs, simulations, and educational games that the system offers are being used not only in the Business Education department but also in the Mathematics, Science, and Social Science departments as well.

The Finance Budget Accounting system provides a full accounting system for the processing of vendor invoices and for departmental cost accounting. The PPBS format provides reports by organizational units, department, and function object. It is interesting to note that the State of Illinois is currently piloting a program accounting system based on the USOE Handbook II Revised. With a few slight modifications to the program, several EMS members, including Maine are currently operating under two systems.

While much of the research functions are provided through the IER component, EMS does provide information for the evaluation of student performance and for determining individualized instructional programs.

The initial advantage of our joining EMS over our in-house computer

installation was the immense cost savings realized in acquiring the various administrative and instructional services. In fact, most of the EMS member districts joined the organization at a fairly substantial cost savings and a rather dramatic service increase beyond services received either from an in-house operation or commercial firm. A 20% to 50% reduction in EDP costs was estimated for those districts who initially formed EMS.

A recent study conducted by Arthur Andersen and Company illustrated the costs of four suburban Chicago school districts' in-house data processing shops. All four districts would realize substantial cost savings ($20,000 - $50,000) and dramatic service increases if they were to join EMS. A fifth school district's (an EMS member) costs were examined in this study. It was determined that the district would be required to spend an additional $33,000 annually to provide a comparable data processing service in-house.

Another recent study of data processing services in a few, multi-district data processing cooperatives similar to EMS indicated a per pupil cost ranging from $7.00 to $23.00. The average paid membership fee for each enrolled student in EMS is $5.90.

What are the alternatives? At Maine, we believe we have found a viable alternative - Educational Management Systems - a system that provides a means for elementary and high school districts to meet nearly all their EDP needs in an economical manner and in the shortest possible time frame.

EDUCATIONAL MANAGEMENT SYSTEM (EMS)

System Reporting Areas and Reports

- Finance Budgeting and Accounting (FBA) - 58 reports
- Payroll Personnel System (PPS) - 48 reports
- Student Information System (SIS) - 101 reports/sorts
    - Census
    - Mark Reporting
    - Student Information
    - Scheduling
- Instruction/Attendance (I/A) - 208 reports/programs
- Special Application Programs - 100 report variations
- Guidance Information System (GIS)

Sample Reporting Capacities (Brief Overview)

- Finance Budgeting and Accounting
    - PPBS format providing reports by organizational unit; department; function object
    - Four year budget planning reports
    - Encumbrance reporting
    - USOE Handbook II (Revised) Reports
    - Vendor information
    - Purchase orders
    - Check register
    - Expense reports
    - Balance sheets (general ledger)
- Payroll Personnel System
    - Payroll masters
    - Payroll checks
    - Check register
    - Payroll register
    - Payroll distribution
    - Deduction register
    - IMRF
    - TRS
    - Payroll Reconciliation
    - W-2
    - Personnel masters
    - School directory
    - Mailing labels
    - Teacher service record
- Student Information System
    - Census master list
    - Census summary
    - Mailing labels
    - Census statistics
    - Child/unit summary
    - 13 sorts
    - Honor rolls
    - Progress reports (grades)

- Incomplete lists
- Failure lists
- Ranking list
- Mark (grade) distribution
- Year end reports
- Transcript labels
- Kindergarten report
- Student master report
- Family directory
- Class directory
- Calendar locator
- Student locator
- Student labels
- 35 sorts
- Course request matrix
- Course lists
- Master schedule
- Conflict list
- Activity master readout
- Teacher load summary
- Room utilization report
- Teacher class list
- Course request cards
- Schedules
- Student distribution
- Student/non-student family list
- Attendance Type Summary

- Instruction/Attendance

  - Simulation
  - Programming
  - Gaming
  - Comprehensive achievement monitoring
  - Problem-solving
  - Daily/period by period attendance
  - Withdrawal and entry statistics
  - Transportation report
  - End of year report (state)
  - Attendance Update Listing
  - Summary Attendance Card
  - Daily Attendance Log
  - Mobility Statistics

- Guidance Information System (GIS)

  - College information
  - Occupational information
  - Scholarship information

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